

**COORDINATED IMPLEMENTATION PLAN  
FOR BIRD CONSERVATION IN NEVADA**

Prepared by  
Nevada Steering Committee  
Intermountain West Joint Venture

2002

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## **Introduction**

In 1986, the North American Waterfowl Management Plan (NAWMP) was adopted by the United States and Canada to address the conservation and restoration of waterfowl, other migratory waterbirds, and the habitats on which they depend. The Plan, as adopted, aims to restore waterfowl populations to 1970-79 levels and establishes specific population objectives for twenty-five species of ducks, five species of geese, plus trumpeter and tundra swans. It was updated in 1994 to include full participation by Mexico, and again in 1998 to include language strongly encouraging Plan partners to improve coordination with other wildlife initiatives, including those directed at other migratory birds, endangered species, fisheries and bio-diversity. It will be updated again in 2003.

Six public-private partnerships, or joint ventures, were originally established by the Plan to coordinate the implementation of NAWMP and achievement of population and habitat objectives along flyway lines across North America, with four more joint ventures having been formed in recent years. These joint venture partnerships include active participation by the U.S. Fish and Wildlife Service, USDA Forest Service, Bureau of Land Management, Natural Resources Conservation Service (USDA), and other federal agencies. As well as state wildlife management agencies and a number of wildlife conservation groups, including Ducks Unlimited Inc., Pheasants Forever, The Nature Conservancy, and National Audubon Society. The North American Wetlands Conservation Act (NAWCA) was set up in 1989 to implement the objectives of NAWMP. This program, re-authorized by Congress in FY/2001 at \$50 million/year, encourages and rewards partnerships among all wildlife conservation initiatives through two matching grant programs, a standard grant program and a small grant program.

The Intermountain West Joint Venture (IWJV) was established in 1994 as the eleventh habitat joint venture. It encompasses parts of eleven Western states, including all of Nevada. Public agencies and conservation groups work as partners through an IWJV State Steering Committee in Nevada to identify, protect, restore and enhance wetlands and other important habitats for waterfowl and other migratory birds, as well as native resident birds such as Sage Grouse.

The Nevada Steering Committee is one of the most active state steering committees in the IWJV. And, includes representatives from the Nevada Division of Wildlife, U.S. Fish and Wildlife Service, Bureau of Land Management, Bureau of Reclamation, U.S. Forest Service, Natural Resource Conservation Service (USDA), Ducks Unlimited, Nevada Waterfowl Association, Lahontan Audubon Society, Great Basin Bird Observatory and The Nature Conservancy of Nevada. The group has been meeting since 1995, as originally as a wetlands and waterfowl group, to consider projects to protect and restore key wetlands and associated upland habitats statewide. In 2001, the first Standard (large) NAWCA grant was approved for Nevada in the Steptoe Valley of White Pine County.

In 1995 the IWJV Management Board adopted an Implementation Plan intended to provide a framework for implementing the NAWMP in Nevada and other states of the Intermountain West, and for developing more specific wetland focus area plans in each of those states. The Nevada Steering Committee defined four waterfowl and wetland focus areas, which were incorporated into the larger IWJV Implementation Plan, adopted in December 1995. The focus areas delineated by the steering committee are Northeast Nevada, Sheldon/Quinn River, Southern Nevada Wetlands, and Western Nevada Wetlands. Waterfowl and wetland habitat objectives were established for the Intermountain West by the IWJV Management Board and included in the 1996 Implementation Plan.

In 2000, the IWJV Management Board determined that the 1995 IWJV Implementation Plan should be updated, as a Strategic Plan, and that it should be completed from the ground up, state-by-state. The Board also decided that this updated planning process should attempt to coordinate NAWMP objectives with other existing migratory bird initiatives operating within the Intermountain West. In 2001, the Board funded a project to work through state steering committees in developing coordinated “all bird” implementation plans in all the states of the Intermountain West Joint Venture. The Nevada Steering Committee stepped forward to take the lead in developing a state implementation plan.

These coordinated “all bird” implementation plans will not only provide the basis for an updated and expanded overall IWJV Implementation Plan, they will also guide the IWJV Management Board in considering and ranking various habitat protection, restoration and enhancement projects for funding via the North American Wetlands Conservation Act (NAWCA) and other programs.

## **2. Planning Objectives**

1. Create a planning forum, through the Nevada Steering Committee of the IWJV, in which representatives of state and federal conservation agencies and wildlife conservation groups work collaboratively to develop coordinated habitat goals, objectives and projects that address the conservation needs of all bird species in Nevada.
2. Review, merge and synthesize the goals and objectives of existing bird conservation plans into a coordinated planning document that reflects the species and habitat priorities of all bird conservation programs in Nevada. This document is intended to guide the Management Board of the Intermountain West Joint Venture (IWJV) in implementing and updating statewide IWJV goals and objectives for bird conservation in Nevada.

## **3. Direction and Connections**

By taking a lead role in coordinated implementation planning in the Western states, the IWJV Management Board is following the direction of the NAWMP (1998 Update). IWJV is also responding to recommendations and direction from other national sources and programs to attempt coordination of waterfowl and wetland habitat planning with the identified goals of other migratory bird programs. These other national sources and programs include the following:

**North American Bird Conservation Initiative (NABCI):** Formed in 1998 as an international forum for public and private efforts to coordinate international conservation efforts of existing major migratory bird initiatives, NABCI works to increase the effectiveness of, and coordination between, existing and new bird conservation initiatives, including the North American Waterfowl Management Plan. As a recommended framework for coordinated bird management, NABCI has adopted and mapped ecological units called Bird Conservation Regions (BCR), a number of which cover the area of the Intermountain West Joint Venture. The Great Basin BCR covers most of the state of Nevada, with the very southern and southwest part of the state being in the Sonoran and Mojave Deserts BCR. These BCRs are also shown as Figure One.

A Great Basin BCR coordinator was hired in 2002 and a big part of his job is to work with IWJV partners to coordinate planning and project design for bird habitat projects in Nevada and other states within the BCR. The BCRs defined by NABCI will probably prove to be the most relevant ecoregions for migratory bird planning and management.

**International Association of Fish and Wildlife Agencies:** The International Association of Fish and Wildlife Agencies (IAFWA) was founded in 1902 as a quasi-governmental organization of public agencies, including state wildlife agencies, charged with the protection and management of North America's fish and wildlife resources. The IAFWA received a federal grant in FY/2001 to conduct "integrated all bird conservation" planning workshops for state wildlife agencies in FY/2001-2003. The national objectives of this grant closely parallel the IWJV's coordinated migratory bird planning effort, and the IWJV is working with IAFWA staff to ensure that the workshops are complementary. Workshops have been conducted in Colorado and Arizona in 2002 and are planned for other IWJV states, including Idaho, in 2003.

**Figure One – Bird Conservation Regions in Nevada**

**Congress:** The U.S. Congress strongly supports a public-private partnership approach to protecting and restoring wetlands and other important migratory bird habitats across North America, and they have signaled their support by increasing the federal funds available for migratory bird initiatives. In FY/2001, Congress re-authorized the North American Wetlands Conservation Act (NAWCA) and increased its authorized annual funding level from \$30 million to \$50 million. The FY/2001 appropriation for NAWCA was also increased to \$40 million, from \$15 million in FY/2000. In FY/2002 Congress increased the funding level for NAWCA to \$43.5 million and recommended a phased-in approach to fully funding the 15 habitat and species joint ventures that were in place in FY/2001. These actions make it clear in budget language that Congress regards these joint ventures as a primary delivery system for all federally-funded migratory bird programs. In its FY/2002 Interior Appropriations language, the House noted that the joint venture program “continues to be one of the greatest successes of the (Fish and Wildlife) Service, with funding leveraged to a greater extent than all other Service programs combined”.

Congress also passed a new Neotropical Migratory Bird Conservation Act (H.R.2217) in 2002, funding the new Act with an initial \$3 million for a matching grants program, and created a new State Wildlife Grant program within the Interior and CJS budgets, which provides funding to state wildlife agencies for wildlife planning and conservation.

**Executive Order 13186 – Protection of Migratory Birds:** In January, 2001 outgoing President Bill Clinton signed an executive order requiring all federal agencies which might have a measurable negative impact on migratory birds to develop a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service, to promote the recommendations of NAWMP, NABCI and other migratory bird programs, as well as other conservation considerations. The Bureau of Land Management and USDA Forest Service signed an MOU with the Fish and Wildlife Service in 2001, which emphasizes a collaborative approach to migratory bird conservation, in cooperation with other agencies and organizations. Because this executive order addresses the integration of bird conservation principles, habitat restoration for migratory birds, and comprehensive planning among various bird conservation programs, these coordinated implementation plans developed by the IWJV should assist these federal agencies with implementation of the MOU. Other federal agencies will presumably also develop MOUs with the Fish and Wildlife Service to implement Executive Order 13186. This presidential Executive Order was reinforced by the Bush Administration on September 12, 2002 when U.S. Fish and Wildlife Service Director Steve Williams issued **Director’s Order No. 146**, which indicates, among other things, that joint ventures should deliver the full spectrum of bird conservation.

#### 4. Migratory Bird Conservation Initiatives

There are four migratory bird initiatives for which national, regional and state plans have been or are being developed. The following programs have different but compatible approaches to planning for bird conservation, but the goals, objectives, and priorities of each will be considered in the IWJV Coordinated Implementation Plan for Bird Conservation in Nevada:

**North American Waterfowl Management Plan (NAWMP):** Adopted by the United States and Canada in 1986, and by Mexico in 1994, to address the conservation and restoration of waterfowl, other migratory waterbirds, and the habitats on which they depend. The Plan, as adopted, aims to restore waterfowl populations to 1970-79 levels and establishes specific population objectives for twenty-five species of ducks, five species of geese, plus Trumpeter and Tundra Swans. Priority waterfowl species for Nevada are shown in Table One and Appendix A.

The Intermountain West Joint is one of eleven public-private partnerships established to coordinate the implementation of NAWMP and the achievement of population and habitat objectives along flyway lines across North America. Public agencies and conservation groups work as partners through an IWJV State Steering Committee in Nevada to identify, protect, restore and enhance wetlands and other important habitats for waterfowl and other migratory birds, as well as native non-migratory birds such as Sage Grouse.

**Partners in Flight:** The national Partners in Flight (PIF) program began in 1989 as a coordinated effort to document and reverse apparent declines in the populations of neotropical migratory birds, those birds that breed north of Mexico and then migrate to Mexico, Central and South America and the Caribbean in the winter months. The National Fish and Wildlife Foundation took the lead in bringing together federal, state, and local government agencies, foundations, conservation groups, industry and the academic community to address the problem of population declines. The reasons are complex, and include loss of breeding habitat due to fragmentation, alteration, urban expansion and natural disasters; loss or alteration of habitat in non-breeding areas and along migratory routes; and brood parasitism. The PIF program was later expanded to include all non-game land birds.

Today Partners in Flight is an international program, with eastern and western regional coordinators and PIF working groups in each state. In 2000, the American Bird Conservancy (ABC) published the first comprehensive national plan for the program, entitled *Partners in Flight: Conservation of the Land Birds of the United States*. This plan summarizes the goals and priorities of the various state Bird Conservation Plans, as well as 93 physiographic areas and seven generalized regions of the continental United States. The plan also encourages better coordination with other initiatives such as the NAWMP, U.S. Shorebird Management Plan, and North American Waterbird Conservation Plan. PIF initially divided Nevada into four physiographic areas, but for purposes of coordinated bird conservation, these have now been replaced by the BCRs discussed on page 4. Passage of the Neotropical Migratory Bird Conservation Act in 2001 provided a new federal funding program and commitment to neotropical migrant species addressed by Partners in Flight.

The Nevada Working Group of Partners in Flight was formed in 1993 to focus resources of PIF partners on the improvement of monitoring, research, management and education programs involving native, non-game landbirds and their habitats. The working group includes many of the same agencies, organizations and people as the IWJV steering committee: Nevada Division of Wildlife, U.S. Fish and Wildlife Service, Bureau of Land Management, Bureau of Reclamation, USDA Forest Service, National Park Service, University of Nevada, Red Rock and Lahontan Audubon Societies, Great Basin Bird Observatory and The Nature Conservancy of Nevada.

In 1996, the Nevada Working Group initiated a *Nevada Bird Conservation Plan* (BCP), which assessed the status of 43 priority species of Nevada landbirds, in four established physiographic regions and 15 major habitat types, and articulated 63 population objectives for these 43 species. This plan, completed

in 1999, remains the best summary of species and associated habitat information for neotropical migrant birds and other native non-game landbirds of Nevada, and is one of primary sources of information used in developing a coordinated implementation plan for bird conservation in Nevada.

Priority species listed by Partners in Flight in the Nevada BCP are listed in Table One of this plan, and associations between priority species and habitat types, taken directly from the Nevada BCP (Appendix B), are included this plan, as Appendix A.

**U.S. Shorebird Conservation Plan:** The term shorebird is applied in North America to a large group of birds commonly called sandpipers and plovers but also include oystercatchers, avocets, and stilts. Of 214 species of shorebirds found worldwide, 53 regularly occur in the United States and, although they occur at some time of the year in all 50 states, the biology and ecology of most shorebird species is poorly understood. Technical and regional working groups were convened to address some of the known conservation and research issues for shorebirds and in 2000, the *U.S. Shorebird Conservation Plan* was published by the Manomet Center for Conservation Sciences, funded by a grant from the U.S. Fish and Wildlife Service. This national plan provides baseline information on shorebird populations and habitat, and addresses some of the known challenges to shorebird conservation, including low reproductive potential and habitat loss. It also articulates hemispheric and national goals for restoring and stabilizing shorebird populations, especially those known to be in decline. These goals emphasize research, monitoring and cooperative landscape management strategies at the international, national, and regional levels. As with NABCI and the Partners In Flight plan, the U.S. Shorebird Conservation Plan encourages close coordination with other bird conservation initiatives and implementation of shorebird conservation strategies through the Intermountain West Joint Venture and other habitat joint ventures established by the North American Waterfowl Management Plan. The shorebird plan defines Shorebird Planning Regions across North America, which follow the lines of NABCI Bird Conservation Regions. All of Nevada is within the plan's Intermountain West Shorebird Planning Region.

A draft *Intermountain West Regional Shorebird Plan* was also released as a draft in 2000. The plan notes that perhaps a million shorebirds breed in the Intermountain West and that millions more migrate through the area each year. The plan recognizes that finding ample high quality fresh water will be the greatest challenge faced by shorebirds in the Intermountain West. The regional plan articulates seven goals and associated objectives and strategies related to habitat management, monitoring and assessment, research, outreach and planning. The planning goal includes objectives to coordinate shorebird planning and projects with other migratory bird initiatives and specifically with the Intermountain West Joint Venture. The Intermountain West plan recognizes eleven Key Shorebird Areas, one of which, Lahontan Valley and Humboldt Sink, is in Nevada. Lahontan Valley/Humboldt Sink is recognized as a Hemispheric Site by the Western Hemisphere Shorebird Reserve Network (WHSRN). Another key area, Honey Lake, is in California but just across the border from Nevada.

Some of the breeding shorebird species of particular concern in Nevada and other Intermountain West states are listed in Table One. These include Long-billed Curlew, Snowy Plover, American Avocet, Black-necked Stilt, Wilson's Phalarope, Long-billed Dowitcher, Spotted Sandpiper, and 13 other species with scores of 4 or 5 in the plan's species scoring process. This Intermountain West Regional Shorebird Plan will provide the primary source of information for shorebird species and habitat objectives for the coordinated migratory bird implementation plan for Nevada. . Priority species from this plan are listed in Table One.

**North American Waterbird Conservation Plan:** The *North American Waterbird Conservation Plan* provides a continental framework for conserving and managing colonial nesting waterbirds, including 209 species of seabirds, coastal waterbirds (gulls, terns, pelicans), wading birds (herons, ibises), and marsh birds, such as certain grebes and bitterns. The overall goal of the plan is to ensure that the distribution, diversity and abundance of populations, habitats (breeding, migratory, and non-breeding) and important sites of waterbirds are sustained or restored throughout their ranges in North America. The geographic scope of the plan covers 28 countries, from Canada to Panama, as well as islands and nearshore areas of the Atlantic, Pacific, Gulf of Mexico, and Caribbean Sea. As with NAWMP and Partners in Flight, the waterbird partnership includes federal, state and provincial wildlife agencies, individuals, and nonprofit conservation organizations. Also as with PIF and other migratory bird plans, this plan includes a goal to establish conservation action and exchange information and expertise with other bird conservation initiatives, especially NABCI and the habitat joint ventures such as IWJV established by the North American Waterfowl Management Plan. The plan also calls for establishment of Practical Units for Planning (PUPs) for terrestrial habitats; Nevada falls within the Intermountain West/Southwest Desert PUP.

Volume One of the North American plan covers 165 species of colonial-nesting birds, as well as three grebes that nest semi-colonially. Volume Two will cover 44 species of marsh birds. In October 2001, a second draft of Volume One was released for review. In this draft plan, the conservation status of all North American waterbird species were evaluated, adapting the protocol from Partners in Flight and U.S. Shorebird Conservation Plan. Under this classification system, a number of species found in Nevada as breeders or migrants fall into the **Species of Moderate Concern** or **Species of Low Concern** categories for North America, Northern Hemisphere, Western Hemisphere, and Cosmopolitan (world-wide) including the American White Pelican, California Gull, White-faced Ibis, Western Grebe, Clark's Grebe, and Green Heron. A number of other species, including the Great Blue Heron, Double-breasted Cormorant, Forster's Tern, Ring-billed Gull, and Great Egret, are found in Nevada but classified as **Species Not at Risk** in North America. The status of these species in Nevada may of course be more or less threatened than their global, hemispheric, or continental status. Priority species from this plan are listed in Table One.

In December 2001 the process was initiated for developing a regional waterbird conservation plan for the Intermountain West/Southwest Desert Practical Planning Unit. A first draft was released in August 2002. When this regional plan is completed, it will articulate conservation and management goals and objectives for waterbirds in Nevada and other states of the Intermountain West Joint Venture, as well as identify and describe habitat types and locations of important waterbird habitat in Nevada and other Western states. It will be the primary source of information for waterbird species and habitat objectives for the coordinated migratory bird implementation plan for Nevada.

## 5. Other Bird Conservation Programs

In addition to the four migratory bird initiative described above, there are a number of other important bird conservation programs which will be reviewed, considered and included in a Coordinated Implementation Plan for Bird Conservation in Nevada. These include:

**Important Bird Areas (IBA) Program:** The IBA Program is an international, site-based approach to bird conservation that began in Europe in the mid-1980s, where BirdLife International sponsored a

continent-wide inventory of key sites for birds. The effort spread to the United States; and in the mid-1990s the American Bird Conservancy and National Audubon Society completed a pilot project to identify and describe the Important Bird Areas of Pennsylvania. As of the summer of 2001, 43 states, including Nevada, have IBA programs and three states have published guides to their IBAs.

The IBA program recognizes that there are places on the landscape that provide exceptionally valuable or essential habitat for one or more species of birds, including breeding, wintering or migratory habitat. Identifying, recognizing, monitoring, and stewarding these sites can form the basis of a landscape-level conservation network, not just for birds but for other species of wildlife.

The selection process for IBA’s examines sites based on the presence, species assemblage, and abundance of birds and the condition and quality of the habitat. Standardized, science-based criteria are used to identify areas as IBA’s. In brief, the Nevada IBA criteria are listed below in Figure 2.

<b>Figure 2: Site Selection Criteria of the Nevada IBA Program</b>	
1.	Sites important to Nevada species of concern (primarily Nevada Partners in Flight Priority list).
2.	Sites harboring species restricted to unique/threatened habitat types.
3.	Sites where significant numbers of birds congregate. Supplementary criteria:
4.	Sites supporting long-term avian research.
5.	Sites providing outstanding educational opportunities.

When completed, the Nevada Important Bird Area Program will be an important component of a coordinated migratory landbird, waterfowl, shorebird and waterbird implementation plan for Nevada. After identifying the best and most important habitats for birds in Nevada, the IBA Program will establish long-term monitoring programs for each IBA. The monitoring program is based on the coordinated efforts of volunteer citizen scientists and agency and NGO biologists. Monitoring of each IBA will develop a database to track population trends at each site, and in the long-term, help identify large-scale trends in bird populations. The IBA program will also work with landowners to develop stewardship plans to guide the management of IBA’s for the long-term benefit of wildlife. IBA status will also help land management agencies and conservation organizations set conservation priorities and solicit funding and support at the national level for local programs.

When the initial review of potential IBA sites is completed in 2003, the Nevada IBA Program will provide an important component of the IWJV Coordinated Bird Implementation Plan.

**Ecoregional Conservation Planning:** The Nature Conservancy (TNC) has adopted ecoregion-based planning as the most effective way to achieve its national mission of preserving a diversity of plants, animals, and natural communities. The planning process used by TNC follows a methodology outlined in *Geography of Hope* (2000) that defines a vision of conservation success at an ecoregional scale, and is based on documenting and mapping a list or “portfolio” of biologically outstanding sites that represent a full complement of ecosystems, natural communities, and species characteristics of the ecoregion., This

methodology may be used to direct TNC programs and influence other conservation efforts across the United States. The ecoregional plans are based on amended ecoregional units delineated by Bailey et al (1998).

The Nature Conservancy of Nevada was assigned lead responsibility for developing a ***Ecoregional Conservation Blueprint for the Great Basin***, which blankets Nevada, the western third of Utah, and part of California, east of the Sierra Nevada mountain range. The rest of Nevada falls within the Columbia Plateau ecoregion to the north, the Mojave Desert ecoregion on the south, or in a small portion of the Sierra Nevada ecoregion in extreme western Nevada. Lead responsibility for these other ecoregional plans was given to Nature Conservancy chapters in Washington and Oregon, Nevada, and California, respectively.

Development of the Conservation Blueprint for the Great Basin began in 1999 and involved extensive literature review, as well as personal interviews with about 170 recognized experts on the flora, fauna and bio-diversity of Nevada and other states of the Great Basin ecoregion. The plan, which was released by The Nature Conservancy in 2001, breaks the ecoregion into 29 “ecological systems” and identifies 358 potential conservation areas, or “portfolio sites”, 249 of which are entirely or partly in Nevada. There are a total of 370 conservation areas in Nevada, all within portions of the four ecoregions in the state.

Although TNC’s ecoregional plans are not specifically bird conservation plans, they do identify and classify those habitat types, areas, and sites which provide important habitat for birds. Only those birds identified as conservation targets for the seven ecoregions are listed for the portfolio sites in those ecoregional plans. Target Bird Species, listed by The Nature Conservancy for each ecological system group, were obtained from the literature and from interviews with acknowledged experts. These target species are listed in Table One, along with priority species from other programs and agencies.

The Nevada Steering Committee of IWJV opted early in this implementation planning exercise to use The Nature Conservancy’s (TNC) ecoregional planning framework as an important source for resource information and the primary source for defining important bird habitats, identifying habitat conservation areas, and linking habitats to priority (target) bird species. The steering committee considered the TNC framework to be important to this effort for a number of reasons: TNC ecoregional data and maps cover the whole state of Nevada; TNC is developing ecoregional plans for other IWJV states; the TNC planning process is current and based on recent interviews with hundreds of wildlife managers and conservation specialists around the state; TNC Portfolio Sites are already depicted on GIS maps, which can be modified to meet our needs; and TNC is working closely with the Nevada steering committee to make its ecoregional planning process relevant to coordinated migratory bird conservation.

**Range-wide Sage Grouse Conservation Project:** The Western Association of Fish and Wildlife Agencies (WAFWA) signed a Memorandum of Understanding in 2000 with the U.S. Fish and Wildlife Service, Forest Service and Bureau of Land Management to develop a strategy for the conservation of Sage Grouse throughout its range. In 2001 the State of Utah and WAFWA received a federal grant to aid sagebrush/Sage Grouse conservation efforts in six or seven Western states and British Columbia. In 2002 a project coordinator was hired with the grant funds and he began coordinating the completion of statewide and province-wide sage grouse databases, including medium-to-fine-scale distribution maps of sage grouse habitat. The project is overseen by a federal-state National Sage Grouse Conservation Framework Team.

**Endangered Species Act:** The Federal Endangered Species Act (ESA) of 1973, as amended, mandates the protection of threatened and endangered species of plants and animals and the development of a recovery plan for each species. In Nevada, there are a number of birds listed as Endangered (E), Threatened (T), Proposed Threatened (PT) or Candidate (C) species under the ESA, including the Yuma Clapper Rail, Southwestern Willow Flycatcher, Mountain Plover and Bald Eagle. Due to their legal status under the ESA, these bird species are automatically included in the list of priority bird species for the IWJV in Nevada, even though independent measures are being taken under the ESA to recover their populations. The U.S Fish and Wildlife Service also maintains a regional Birds of Conservation Concern list and an unofficial, county-by-county “species of concern” list, which includes a number of birds that could become Candidate species for ESA listing in the future; these species are also included in Table One, the combined list of priority bird species for Nevada.

## 6. Priority Bird Species

The bird conservation planning programs described above, including the federal Endangered Species Act and the North American Waterfowl Management Plan/IWJV, have developed or will develop, as part of their overall planning process, a list of priority bird species, species of concern, or target species, either for Nevada or the entire Intermountain West region. The Nevada Steering Committee has reviewed all of these lists, including target bird species in TNC’s *Ecoregional Conservation Blueprint for the Great Basin*, and they have combined and indexed these priority species as Table One. These priority species, by agency and program, are also shown in a matrix labeled as Appendix B.

## 7. Priority Species-Habitat Relationships

Two systems for defining wildlife habitats or habitat types were considered by the Nevada Steering Committee in this planning process. The Partners in Flight *Bird Conservation Plan* defined 15 Habitat Types for Nevada. The TNC *Ecoregional Conservation Blueprint for the Great Basin* defines 29 Ecological Systems for the state. The Nevada Steering Committee decided to use and cross-reference both systems, but to use the Partners in Flight definitions for defining and ranking bird habitat types. Table Two of this planning document cross-references the two sets of definitions.

Appendix A is a matrix, adapted from the 1999 *Nevada Bird Conservation Plan*, which keys the priority species in Table One to the 15 habitat types defined by Nevada Partners in Flight in the *Nevada Bird Conservation Plan*. Habitat definitions used by The Nature Conservancy, as used in their *Great Basin Ecoregional Conservation Blueprint*, as well as their Columbia Plateau and Mojave Desert ecoregional plans, are provided as background information here as Appendix B.

## 8. Priority Habitat Types

In October and December, 2002, the Nevada Steering Committee met in Reno and ranked the major habitat types defined by the 1999 *Nevada Bird Conservation Plan* into three categories of priority, A, B and C, defined below. Three criteria were used to rank these habitat types: 1) Statewide importance to birds; 2) Opportunities (funding, partnerships, and feasibility for habitat protection, restoration, enhancement); and 3) Degree of threat. The three categories were defined as:

Priority A: High threat, high opportunity, and high value to birds statewide

- Priority B: One criterion may be high, but generally the habitat is of moderate concern  
 Priority C: Relatively low threat, low opportunity, low value as habitat statewide

The ranked list of habitat types developed by the Nevada Steering Committee is shown as Table 3.

## 9. Habitat Conservation Areas/Functional Landscape Sites

The Nevada Steering Committee decided to use the Nature Conservancy’s ecoregional plans for defining and prioritizing habitat conservation areas. TNC takes a “bottom-up” approach to ecoregional planning; “conservation targets”, both species and plant communities, are decided upon and then assigned to “ecological systems” (habitat types). TNC then identifies “portfolio sites” in the ecoregion, which are eventually expanded to “functional landscape sites” and/or “aggregations”, which are shown on ecoregional maps.

The Planning Site Subcommittee of the Nevada Steering Committee reviewed all of the landscape sites in the TNC ecoregional plan for the Great Basin, eliminated some that they felt had no particular importance for priority bird species, then divided the remaining 68 sites into two groups: **First Priority Sites** are those with a majority of the site having habitats of particular importance to IWJV and included wetlands, lowland riparian, and mesquite/catclaw habitats. **Second Priority Sites** are those with a majority of the site having habitats of less importance to IWJV and included montane riparian, montane shrub/mountain mahogany and salt desert shrub. These sites, prioritized by the Subcommittee into two groupings, are included here as Tables 4 and 5. The Steering Committee met twice again in 2002 and selected 19 of the first priority landscape sites, which the committee felt were the highest priority areas in Nevada for the conservation of all birds. The Steering Committee used the same basic criteria as they did in ranking habitat types: 1) the importance of the area for priority birds and habitats, 2) the presence of significant threats, and 3) available conservation opportunities. These priority Habitat Conservation Areas are listed as Table 6 and briefly described in Appendix C, with narrative taken from The Nature Conservancy’s Great Basin Ecoregional Conservation Blueprint.

## 10. Habitat Goals and Objectives

The Nevada Steering Committee met twice in 2002 and established directional goals and six-year (2004-2010) measurable objectives goals for 12 of the Major Habitat Types defined in the *Nevada Bird Conservation Plan*. These habitat types are cross-referenced to the TNC’s functional landscape site definitions in Table 2. The Steering Committee met again in December, 2002. Using Nevada GAP data provided by the University of Nevada-Reno, specific habitat goals and objectives drafted by one member of the Steering Committee, and their own collective knowledge about the wildlife resources of Nevada; the Steering Committee proposed measurable statewide habitat objectives for all 12 habitat types in the A and B categories. These goals and objectives are included as Table 7. These habitat goals and objectives will be reviewed by the whole Nevada steering committee and other key people outside the Steering Committee then used as part of the base information for a regional Intermountain West Joint Venture Strategic Plan in 2003. The Nevada Steering Committee will continue to meet and develop more specific habitat and species objectives, which they will use for developing their own priorities and projects within the Intermountain West Joint Venture.

## 11. Landscape Mapping

The Nevada Steering Committee used TNC’s Great Basin Ecoregional Blueprint map, as well as site descriptions from other TNC ecoregions, to define and prioritize the 19 Habitat Conservation Areas listed in Table 6. A separate GIS map will be produced to delineate those 19 areas defined by TNC. The coordinated “all bird” implementation plan for Nevada is the first plan completed for the IWJV, and the approaches taken here are being used and adapted in the other IWJV states for both the implementation plan and the mapping of Habitat Conservation Areas.

**TABLE ONE – PRIORITY BIRD SPECIES FROM BIRD CONSERVATION PROGRAMS**

Species	North American Waterfowl Management Plan (NAWMP)	Partners in Flight Bird Conservation Plan (BCP)	US Shorebird Conservation Plan, Intermtn West Regional Shorebird Plan	North American Waterbird Conservation Plan (NAWCP)	Great Basin Ecoregional Conservation Blueprint (TNC)	Federal Endangered Species Act (ESA)	Species of Conservation Concern - USFWS Region One
American Avocet		X	X	NA	X		
American White Pelican		X		NA	X		
American Wigeon	X						
Ash-Throated Flycatcher		X					
Bald Eagle						T	
Bank Swallow		X					
Bell's Vireo							
Black Rosy Finch		X			X		
Black Tern		X		C			X
Black-Bellied Plover			X				
Black-Crowned Night Heron				C			
Black-necked Stilt			X				
Black-throated Gray Warbler		X					
Blue Grosbeak		X			X		
Bobolink		X					
Brewer's Sparrow					X		
Burrowing Owl		X					
California Gull				NA	X		
California spotted owl							
Calliope Hummingbird		X			X		X
Canada Goose (RMP)	X						
Canvasback	X						
Caspian Tern				C			
Cinnamon Teal	X						
Clappers Rail							
Clark's Grebe		X		NA			

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Columbian sharp-tailed grouse									X
Common Snipe			X						
Common Tern					C				
Cooper's Hawk		X				X			
Eared Grebe						X			
Ferruginous Hawk			X			X			X
Flammulated Owl		X				X			
Franklin's Gull					WH	X			
Gadwall	X								
Grace's Warbler		X							
Gray Flycatcher		X				X			
Species	North American Waterfowl Management Plan (NAWMP)	Partners in Flight Bird Conservation Plan (BCP)	US Shorebird Conservation Plan, Interntn West Regional Shorebird Plan	North American Waterbird Conservation Plan (NAWCP)	Great Basin Ecoregional Conservation Blueprint (TNC)	Federal Endangered Species Act (ESA)	Species of Conservation Concern - USFWS Region One		
Gray Vireo		X							
Greater sandhill crane		X			X				
Greater White-fronted Goose	X								
Greater Yellowlegs				X					
Green-winged Teal	X								
Juniper (Plain) Titmouse		X			X				
Killdeer			X						
Least Bittern					X			X	
Least Sandpiper			X						
Leconte's Thrasher		X							
Lesser Scaup	X								
Lesser snow goose	X								
Lewis' Woodpecker		X			X				
Loggerhead Shrike		X			X				
Long-billed Curlew		X	X		X				
Long-billed Dowitcher			X						
Lucy's Warbler		X							
Macgillvray's Warbler		X							
Mallard	X								

COORDINATED IMPLEMENTATION PLAN FOR BIRD CONSERVATION IN NEVADA

Marbled Godwit									
Mountain Plover				X				PT	
Northern Goshawk			X				X		X
Northern Harrier							X		
Northern Pintail	X								
Northern Shoveler	X								
Olive-sided Flycatcher			X						
Orange-crowned Warbler			X						
Peregrine Falcon							X		
Phainopepla									
Pinyon Jay			X				X		
Prairie Falcon			X				X		
Redhead							X		
Red-naped Sapsucker			X						
Red-necked Phalarope					X				
Ring-necked Duck	X								
Ross' Goose									
Sage Grouse			X				X		X
Sage Sparrow			X				X		

Species	North American Waterfowl Management Plan (NAWMP)	Partners in Flight Bird Conservation Plan (BCP)	US Shorebird Conservation Plan, Interntn West Regional Shorebird Plan	North American Waterbird Conservation Plan (NAWCP)	Great Basin Ecoregional Conservation Blueprint (TNC)	Federal Endangered Species Act (ESA)	Species of Conservation Concern - USFWS Region One
Sage Thrasher		X					
Sandhill Crane							
Scott's Oriole		X					
Semipalmated Sandpiper			X				
Sharp-tailed Grouse							
Short-eared Owl		X					
Snow Goose							
Snowy Egret				WH			
Snowy Plover		X					
Solitary Sandpiper			X				
Spotted Owl							

COORDINATED IMPLEMENTATION PLAN FOR BIRD CONSERVATION IN NEVADA

SW Willow Flycatcher		X				X		E	
Swainson's Hawk		X	X			X			
Three-toed Woodpecker		X							
Tri-colored Blackbird									X
Trumpeter Swan	X								
Tundra Swan	X								
Upland Sandpiper				X					
Vesper Sparrow		X							
Virginia's Warbler		X				X			
Western Bluebird		X							
Western burrowing owl									X
Western Grebe					N/A				
Western Sandpiper				X					
Western snowy plover						X			
Western yellow-billed cuckoo						X		C	
White-faced Ibis		X			WH	X			X
White-headed Woodpecker		X							
Willet				X					
Willow Flycatcher		X							
Wilson's Phalarope				X		X			
Wilson's Warbler		X							
Wood Duck	X								
Yellow-billed Cuckoo		X							
Yellow-breasted Chat		X				X			
Yuma clapper rail								E	

NAWMP - 19 species/subspecies in Nevada  
 Partners in Flight (BCF) - 51 species  
 US Shorebird Plan / Intermountain West Regional Shorebird Plan - 20 species  
 NAWCP - (NA = North America; WH = Western Hemisphere; C = Cosmopolitan)  
 Great Basin Ecoregional Conservation Blueprint (TNC) - 37 species  
 Federal Endangered Species Act (ESA) - 5 species  
 Species of Conservation Concern - USFWS - 10 species

**TABLE TWO**

**Comparison of PIF and TNC Habitat Classifications**

Approximately reconciles TNC’s Great Basin Ecoregional Blueprint (2001) habitat definitions (Ecological Systems) with the habitat definitions in the 1999 Nevada Bird Conservation Plan (Partners in Flight).

<u>TNC Systems Group/Ecological System</u>	<u>PIF Habitat Type</u>
<b>1. Riparian/Wetlands Systems Group</b>	
Desert Riparian	Lowland Riparian
Desert Riparian/Mesquite	Mesquite-Catclaw
Montane Riparian Woodland	Montane Riparian/Aspen
Montane Riparian Shrubland	Montane Riparian
Freshwater Marsh	Wetlands/Lakes
Wet Meadow	Wetlands/Lakes
Fens and bogs	Wetlands/Lakes
<b>2. Aquatics</b>	
Permanent Standing Water	Wetlands/Lakes
Permanent Flowing Water	Wetlands/Lakes
Ephemeral Standing Water (inc playas)	Wetlands/Lakes
Ephemeral Flowing Water/Mesquite	Wetlands/Lakes
<b>3. Lower Montane</b>	
Pinyon-Juniper Woodland	Pinyon-Juniper
Low Montane Shrubland	Montane Shrub
Mountain Mahogany Woodland	Mountain Mahogany
<b>4. Sagebrush Semi-desert</b>	
Sagebrush Semi-desert	Sagebrush
Sagebrush Steppe	Sagebrush
Bitterbrush Shrubland	Sagebrush
<b>5. Montane to Alpine</b>	
Mountain Sagebrush	Sagebrush
Montane Forest and Woodland	Coniferous Forest
Sub-alpine Forest and Woodland	Coniferous Forest
Alpine Herbaceous	*
Ponderosa Pine Woodland	Coniferous Forest
Montane Meadow	Montane Parkland

<u>TNC Systems Group/Ecological System</u>	<u>PIF Habitat Type</u>
<b>6. Basins and Desert Scrub</b>	
Salt Desert Scrub	Salt Desert Scrub
Greasewood Scrubland	Salt Desert Scrub
Semi-desert Shrub-Steppe	Salt Desert Scrub
Playa Lake/Pickleweed Flats	*
Blackbrush-Hopsage Shrubland	Salt Desert Shrub
Joshua Tree-Mixed Mojave Scrub	*
<b>7. Sand Dunes and Badlands</b>	
Badlands	*
Sand Dunes	Salt Desert Scrub
Cliffland Habitats	Cliffs and Talus
Altered Andesite Soils	Coniferous Forest
Caves	*
<b>8. *</b>	Agricultural Habitat
(* = no counterpart)	
<b>9. Mojave Desert Ecoregion</b> (to be completed later with information from TNC)	
<b>10. Sierra Nevada Ecoregion</b> (to be completed later with information from TNC)	
<b>11. Columbia Plateau Ecoregion</b> (to be completed later with information from TNC)	

## TABLE THREE

### Prioritization of 17 Major Bird Habitats in Nevada

Priority A Habitats: High overall rating: high to medium value to birds, high to medium threat, high to medium opportunity for protection, restoration, and or enhancement of habitat.

**Wetlands:** The strategic location of Nevada’s wetlands make them particularly important resting, feeding and breeding habitat for migrating waterfowl, shorebirds and waterbird, as well as a host of resident fish and wildlife. Some wetlands are adequately protected; others are inadequately maintained by water and/or are threatened by land and water development.

**Lowland Riparian:** These habitats are associated with the floodplains of Nevada’s major river systems occurring below 5,000 feet in northern Nevada and below 4,000 feet in southern Nevada, including the Humboldt, Truckee, Carson and Walker Rivers in the north and the Colorado River and tributaries in the south. Lowland riparian systems are among the most productive and critical habitat for a wide range of resident and migratory birds and other wildlife. They are also among the most drastically altered by human intervention and development, including irrigation diversion, livestock grazing, and pollution. Statewide, lowland riparian systems are degraded and declining in both quality and quantity of habitat available to birds.

**Mesquite/Catclaw:** Mesquite and catclaw acacia are distributed along washes and riparian areas in the Mojave Desert ecoregion of southern Nevada, generally below 3,000 feet in elevation. A number of priority bird species use these habitats, including loggerhead shrike, Lucy’s warbler and phainopepla. Mesquite and catclaw communities have both been decimated by lowered water tables and other human-caused factors such as gravel mining, woodcutting, wildfire and direct development of the landscape. Many stands of mesquite and catclaw have also been replaced by exotics such as red brome, cheatgrass, and salt cedar. Habitat quality and quantity continues to decline with rapid commercial and residential development in southern Nevada.

**Sagebrush:** Native sagebrush habitats are in serious decline throughout the Great Basin, along with sagebrush-obligate bird species such as Sage Grouse. The condition of remaining sagebrush habitat in Nevada is often badly damaged due to over-grazing and introduction of exotic grasses and forbs.

**Aspen:** Aspen stands are found statewide in Nevada at elevations between 6,000 and 8,000 feet, either as riparian stringers or more commonly as disjunct patches in stream bottoms, ridgelines, or talus slopes. Aspen stands are diminished in both number and quality due to a number of factors, including over-grazing, fire suppression, and severe recreational use. This declining trend continues.

**Montane parkland – Great Basin:** This habitat type includes high-elevation mountain meadows that occur in the sagebrush-covered mountains of interior Nevada. At 5,000 to 10,000 feet, montane parklands are primarily found in valley bottoms and associated with streams, springs, and glacial lakes. Meadows are important for a number of priority bird species, including juvenile Sage Grouse, which depend on them for both insect and plant foods. Montane parklands are threatened by improper grazing practices, recreation, and encroachment by pinyon-juniper.

Priority B Habitat: Medium overall rating: one criterion may be high (habitat value, threat, opportunity) but generally of medium importance to birds statewide.

**Montane Riparian:** This habitat type generally occurs along streams and drainages of most mountain ranges in Nevada, generally above the alluvial fans of major valleys. Montane riparian sites include cottonwood, alder, birch, willow, wild rose and red-osier dogwood. Aspen is described above as a separate habitat type. Obligate bird species include Wilson's and MacGillvray's Warblers, but Montane riparian habitat is locally important to other species including Cooper's Hawk, Northern Goshawk, Calliope Hummingbird, Lewis's Woodpecker and Red-naped Sapsucker. Montane riparian systems have been degraded for many years by improper grazing practices, hydraulic mining, road building and off-road vehicular use. Fire suppression has also contributed to the progression of riparian tree stands toward mature, non-regenerative conditions.

**Montane parkland – Sierra Nevada:** This habitat type includes high-elevation mountain meadows that occur on the east slope of the Sierra Nevada range. At 5,000 to 10,000 feet, Montane parklands are primarily found in valley bottoms and associated with streams, springs, and glacial lakes. Meadows are important for a number of priority bird species. Montane parklands in the Sierra Nevada ecoregion are threatened by improper grazing practices, recreation and encroachment by lodgepole pine.

**Montane shrub/Mountain mahogany:** These two habitat types occur throughout the Great Basin, often in a mosaic with other Montane habitat types, at elevations from 5,000 to 10,000 feet. They generally occur where annual precipitation exceeds 12 inches/year and provide important foraging and nesting habitat for a number of raptors and canopy-nesting species, including western bluebirds, and a number of warbler species. Over-grazing and wildfire remain as negative influences.

**Coniferous forest: Sierra Nevada:** Eastern Sierra Nevada forests are the most diverse of Nevada's coniferous forests, transitioning in elevation from Jeffrey and Ponderosa pine to red fir, western white pine, lodgepole pine, and mountain hemlock. Over-harvest of timber in the 1880's and later insect infestations took a toll on the extent and species diversity of eastern Sierra Nevada forests. Coniferous forests in Nevada host a number of priority bird species, including Northern Goshawk, Cooper's Hawk, Lewis's Woodpecker, Flammulated Owl, Three-toed Woodpecker, and Western Bluebird.

**Pinyon-juniper:** Pinyon-juniper woodlands are found in the Great Basin as pure or nearly pure stands of single-leaf pinyon and any of four species of juniper. Pinyon-juniper is largely absent from northwestern Nevada. A number of priority bird species are pinyon-juniper obligates, including gray vireo, black-throated gray warbler and pinyon jay. Although early timber harvest for the mines and recent tree eradication measures for livestock have take their toll on pinyon-juniper forests, the current coverage in Nevada is still almost 18 million acres and expanding. The quality of pinyon-juniper stands is declining in quality (explain...).

**Agricultural land:** Most of Nevada’s agricultural lands are found in fertile valley bottoms and river systems, at elevations from 600 to 7,500 feet. Much of Nevada’s agriculture lands have been created from native habitat types, ranging from greasewood flats to cattail marshes, and the primary harvested crop is hay, followed by wheat. A number of resident and migratory bird species and other wildlife have adapted to and thrive in agricultural throughout the state, including many wintering raptors, which feed on voles and mice. Currently, the greatest threat to Nevada’s declining agricultural land base and associated wildlife is from commercial and residential development, which is not expected to abate in the near future.

**Priority C: Low overall rating: low to medium relative habitat value, threat, and/or opportunity statewide.**

**Salt desert scrub:** The salt desert scrub habitat type is the most extensive in Nevada, covering roughly 22 million acres in the Great Basin ecoregion. The general habitat type encompasses several plant subtypes characterized by salt-tolerant shrubs of the Goosefoot family, often shadscale or greasewood, as well as Indian ricegrass, all of which thrive in areas with generally less than 10 inches/year of precipitation. Birds of the salt desert scrub habitat type are expectedly sparse and lacking in diversity, with the most important species, from a conservation perspective, being the Loggerhead Shrike. This habitat type is not declining significantly statewide. The goal is to maintain salt desert scrub habitat in good condition.

**Mojave shrub:** Two major shrub communities characterize this habitat type in the Mojave Desert ecoregion, creosote-bursage, from 500 to about 4,200 feet elevation, and blackbrush-Joshua tree, from 4,200 to as high as 6,000 feet elevation. This habitat type is experiencing recreational ORV use and intense development pressures in some areas of southern Nevada and, as development expands, there will be some decline in this habitat type. However, many areas are in protected status on public land and not in immediate jeopardy. The goal is to offset habitat losses with long-term protection of Mojave shrub in other areas and landscapes.

**Coniferous forest: Southern Nevada:** The Spring and Sheep Mountains of southern Nevada are islands of ponderosa and white pine in the Mojave Desert ecoregion. Coniferous forests in Nevada host a number of priority bird species, including Northern Goshawk, Cooper’s Hawk, Lewis’s Woodpecker, Flammulated Owl, Three-toed Woodpecker, and Western Bluebird. Limber pine was over-harvested for the gold and silver mines during the late 1880’s and early 1900’s and only exists today in isolated stands. The primary threat to the coniferous forests of southern Nevada is catastrophic wildfire. The goal is to provide a continuum of forest diversity for wildlife.

**Coniferous forest: Eastern Nevada:** Eastern Nevada forests reflect a strong Rocky Mountain influence. The Rocky Mountain form of ponderosa pine occurs on dry, rocky slopes and the Rocky Mountain form of Douglas fir forms pure stands on moister slopes or occurs with Englemann spruce and subalpine fir in its upper reaches. Subalpine fir is often associated with aspen both on streams and slopes. Coniferous forests in Nevada host a number of priority bird species, including Northern Goshawk, Cooper’s Hawk, Lewis’s Woodpecker, Flammulated Owl, Three-toed Woodpecker, and Western Bluebird. The goal is to provide a continuum of forest diversity for wildlife.

**Cliffs and talus:** Cliffs and talus slopes provide important habitat for passerines such as wrens and, as well as raptors such as prairie falcons and ferruginous hawks. Statewide, these areas are relatively stable but susceptible to disturbance and mildly threatened by human activities such as mining, rock climbing and development at the base of rock formations. The goal is to evaluate and review the value of these habitats and maintain the condition of important cliff and talus areas.

Original source of information (modified here): Partners in Flight *Nevada Bird Conservation Plan* (1999)

**TABLE FOUR**

**Priority Landscape Sites – Great Basin Ecoregion**

First Priority Sites	Second Priority Sites
Argenta Marsh	Bald Mountain
Artesia Lake/East Pine Nut Mountains	Battle Mountain
Black Rock Desert/Smoke Creek Desert	Beaver Dam Wash/Bull Valley Mountain
Bodie Hills	Belted Range/Kawich Vy/Gold Flat/Timber Mtn
Butler Basin	Blowsand Mountains/Barnett Hills
Carson Range Front (Long Valley)	Blue Lakes/Badlands
Carson River	Crescent Dunes
Carson Sink	Dry Lake Valley
Cave Valley/Upper White River Valley	Fly Ranch Geyser/Granite Range
Cortez Mtns/Roberts Mtns/Sulphur Spring Range	Goshute Mountains
Currant Mountain	Lone Mountain/Monte Cristo Range
Desatoya Mountains	Long Valley
Duck Creek Range/Steptoe Valley	Meadow Valley
Duckwater Valley	New Pass
East Humboldt Range	Pilot Range
Fourmile Basin	Quinn Canyon Range/Grant Range
Garfield Flat/Rhodes Saltmarsh/Teels Marsh	Rainbow Canyon
Humboldt Range	Sand Mountain
Humboldt River-Golconda	Stoneberger Basin
Humboldt River-Imlay	Sweetwater Mountains
Jackson Mountains Railroad Valley	Virginia Range
Lovelock Valley	Warm Springs Valley
Pequop Mountains/Toana Draw	Wellington Hills
Pilot Mountains	White Pine Range
Pyramid Lake/Lower Truckee River	
Quinn River	
Railroad Valley	
Ruby Mountains	
Schell Creek Range	
Shoshone Range/Carico Lake Valley	
Shoshone/Beowawe	
Silver State Sand Dunes	
Simpson Park Mountains/N Toiyabe Range	
Snake Range	
Soldier Meadows	
South Pine Nut Mountains	
Toiyabe Range/Big Smoky Valley	
Toquima Range/Monitor Valley/Monitor Range	
Upper Humboldt River/Lower Mary's River	
Walker Lake/Walker River	
White Mountains	
White River Valley	
White Rock Mountains	

**TABLE FIVE**

**Priority Habitat Aggregations – Mojave Desert Ecoregion**

First Priority Sites

Second Priority Sites

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Amargosa River  
 Colorado River  
 Coyote Springs  
 Gold Butte Pakoon  
 Mormon Mesa  
 Muddy Mountains  
 Muddy River Complex  
 Nellis Air Force Ranges  
 Pahrnagat Valley  
 Piute-Eldorado  
 Spring Mountains  
 Virgin River

**Priority Landscape Sites – Columbia Plateau Ecoregion**

First Priority Sites

Second Priority Sites

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Jarbridge Creek  
 Upper Humboldt/Lower Mary’s River  
 Piute Creek/Sheldon  
 Santa Rosa Mountains  
 Duck Valley  
 Lower Surprise Valley

Fly Ranch Geysers/Granite Range

**Priority Landscape Sites – Sierra Nevada Ecoregion**

First Priority Sites

Second Priority Sites

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Big Meadow  
 Mt. Rose  
 Lake Tahoe  
 Peavine Mountain  
 Tahoe Meadows  
 Truckee River

**TABLE SIX**

**Habitat Conservation Areas**

1.	Argenta Marsh	Great Basin Ecoregion
2.	Amargosa River/Beatty/Ash Meadows	Mojave Desert Ecoregion
3.	Carson River	Great Basin Ecoregion
4.	Lahontan Valley/Carson Sink	Great Basin Ecoregion
5.	Muddy River Complex/Meadow Valley Wash	Mojave Desert Ecoregion
6.	Pahranagat Valley/White River	Mojave Desert Ecoregion
7.	Piute/Eldorado	Mojave Desert Ecoregion
8.	Pyramid Lake/Lower Truckee River	Great Basin Ecoregion
9.	Duck Creek Range/Steptoe Valley	Great Basin Ecoregion
10.	Virgin River	Mojave Desert Ecoregion
11.	Walker Lake/Walker River	Great Basin Ecoregion
12.	Ruby Mountains/Ruby Marshes	Great Basin Ecoregion
13.	Humboldt River	Great Basin Ecoregion
14.	Washoe Valley/Washoe Lake	Great Basin Ecoregion
15.	Humboldt Sink	Great Basin Ecoregion
16.	Upper Truckee River	Sierra Nevada Ecoregion
17.	North-central Elko County (Aspen)	Columbia Plateau Ecoregion
18.	Sheldon/Quinn River	Columbia Plateau Ecoregion
19.	Sage Grouse Habitat	Northern 2/3 of Nevada

## TABLE SEVEN

### Statewide Goals and Objectives for Priority Bird Habitats in Nevada

Between 2003 and 2010, Intermountain West Joint Venture partners in Nevada will pursue the following statewide directional goals and measurable objectives for priority bird habitats (Priority A and B):

Priority A Habitats: High overall rating: high to medium value to birds, high to medium threat, high to medium opportunity for protection, restoration, and or enhancement of habitat.

#### **WETLANDS:**

**Statewide Goal:** Protect and maintain existing wetland habitats in good condition, and restore and improve degraded wetland habitats whenever opportunities arise.

**Statewide Objective:** Permanently protect and/or restore 25,000 acres of high-quality wetlands and associated habitats in Nevada.

#### **LOWLAND RIPARIAN:**

**Statewide Goal:** Protect, restore and enhance lowland riparian systems wherever possible.

**Statewide Objective:** Permanently protect and/or restore 300 linear miles of lowland riparian habitat in Nevada.

#### **MESQUITE/CATCLAW:**

**Statewide Goal:** Minimize the loss of mesquite and catclaw habitats wherever possible.

**Statewide Objective:** Permanently protect and/or restore 8,000 acres of mesquite and catclaw habitat in Clark County and other areas of southern Nevada impacted by growth and development.

#### **SAGEBRUSH:**

**Statewide Goal:** Stem the quantitative and qualitative decline of sagebrush by protecting, restoring, and improving sagebrush habitats, wherever possible.

**Statewide Objective:** Permanently protect and/or restore 240,000 acres of sagebrush habitat in Nevada.

#### **ASPEN:**

**Statewide goal:** Reverse the loss of aspen habitat and restore and stabilize degraded aspen habitat, wherever possible.

**Statewide Objective:** Permanently protect and/or restore aspen habitat within a 40,000 acre management unit in Nevada.

**MONTANE PARKLAND – Great Basin:**

**Great Basin Goal:** Reverse habitat decline, through sound land use management and application of both restrictions and incentives to reduce negative practices such as over-grazing.

**Great Basin Objective:** Permanently protect and/or restore 350 acres of montane parkland habitat in the Great Basin Ecoregion in Nevada.

Priority B Habitat: Medium overall rating: one criterion may be high (habitat value, threat, opportunity) but generally of medium importance to birds statewide.

**MONTANE RIPARIAN:**

**Statewide Goal:** Protect, restore and enhance montane riparian systems wherever possible.

**Statewide Objective:** Permanently protect and/or restore 150 linear miles of montane riparian habitat in Nevada.

**MONTANE PARKLAND – Sierra Nevada:**

**Sierra Nevada Goal:** Reverse the decline of montane parkland habitat in the Sierra Nevada Ecoregion of Nevada, through sound land use management and application of both restrictions and incentives to reduce negative practices such as over-grazing.

**Sierra Nevada Objective:** Permanently protect and/or restore 50 acres of lowland riparian habitat in the Sierra Nevada Ecoregion of Nevada.

**MONTANE SHRUB/MOUNTAIN MAHOGANY:**

**Statewide Goal:** Maintain existing montane shrub communities where possible and reverse the declining trend of mountain mahogany habitat statewide.

**Statewide Objective:** Permanently protect and/or restore 90,000 acres of montane shrub/mountain mahogany habitat in Nevada.

**CONIFEROUS FOREST: Sierra Nevada:**

**Sierra Nevada Goal:** Maintain forest stand diversity in Sierra Nevada coniferous forests, wherever possible.

**Sierra Nevada Objective:** Maintain forest stand diversity on 3,000 acres of Sierra Nevada coniferous forests.

**PINYON-JUNIPER:**

**Statewide Goal:** Manage pinyon-juniper stands for habitat quality and diversity of succession, in order to maintain a diverse population of pinyon-juniper-obligate bird species.

**Statewide Objective:** Implement alternative management on 75,000 acres of pinyon-juniper forest in Nevada to support diversity of successional stages.

**AGRICULTURAL LAND:**

**Statewide Goal:** Assist landowners to maintain or improve the wildlife habitat values on their lands.

**Statewide Objective:** Protect, restore and/or enhance wildlife habitat values on 13,000 acres of privately-owned agricultural lands in Nevada.

**Priority C: Low overall rating: low to medium relative habitat value, threat, and/or opportunity statewide. Goals and objectives not established for Priority C habitats.**

**SALT DESERT SCRUB**

**MOJAVE SHRUB**

**CONIFEROUS FOREST: Southern Nevada**

**CONIFEROUS FOREST: Eastern Nevada**

**CLIFFS AND TALUS**

**APPENDIX A – PRIORITY BIRD SPECIES BY OF NV BY HABITAT (PIF Habitat Type)**

B=Breeding; M=Significant Migration; W=Significant Wintering; \*=Accidental, Casual, or Regular Visitor in small numbers; F=Feeding

Species	Ag Lands	Aspen	Cliffs & Talus	Coniferous Forest	Lowland Riparian	Mesquite Catclaw	Mojave Shrub	Montane Parkland	Montane Riparian	Montane Shrub	Mountain Mahogany	Pinyon Juniper	Sage-brush	Salt Desert Scrub	Wetlands & Lakes
American Avocet	F				F										B
American White Pelican															B
American Wigeon	M							M							W
Ash-Throated Flycatcher					B	B			B						
Bald Eagle	M			B	B							B			B
Bank Swallow	B				B										B
Bell's Vireo					B										
Black Rosy Finch			B							W	W		W		
Black Tern					M										B
Black-Bellied Plover	M														M
Black-Crowned Night Heron					B										B
Black-necked Stilt	F				F										B
Black-throated Gray Warbler										F					
Blue Grosbeak					B										
Bobolink	B				B				B						
Brewer's Sparrow							M								
Burrowing Owl	B				B	B		B					B	M	
California Gull	F				F										B
Calliope Hummingbird		B						F	B	B?	B?				
Canada Goose (RMP)	B				B			B							B
Canvasback															W

COORDINATED IMPLEMENTATION PLAN FOR BIRD CONSERVATION IN NEVADA

Caspian Tern					F															B
Cinnamon Teal	B							B												B
Clappers Rail																				*
Clark's Grebe																				B
Common Snipe	B							B												B

Species	Ag Lands	Aspen	Cliffs & Talus	Coniferous Forest	Lowland Riparian	Mesquite Catclaw	Mojave Shrub	Montane Parkland	Montane Riparian	Montane Shrub	Mountain Mahogany	Pinyon Juniper	Sage-brush	Salt Desert Scrub	Wetlands & Lakes
Common Tern															*
Cooper's Hawk	M	B		B	B				B			B	F		B
Eared Grebe															B
Ferruginous Hawk	W		B		W							B	B	M	W
Flammulated Owl		M?		B		M?						B	B		
Franklin's Gull	F				M							B?			B
Gadwall	B				B										B
Grace's Warbler				B											
Gray Flycatcher												B	B	B	W
Gray Vireo							B?								
Greater White-fronted Goose	M														M
Greater Yellowlegs	M			M										W	M
Green-winged Teal	M							M							W
Juniper (Plain) Titmouse												B?	B?	B	
Killdeer	B				B				B						B
Least Bittern															B
Least Sandpiper					M										M
Leconte's Thrasher							B								
Lesser Scaup					M			M							W
Lewis' Woodpecker		B		B	M				B						







## APPENDIX B

### Description of TNC Ecological Systems (Aquatic and Terrestrial)

(From: The Nature Conservancy's Great Basin Ecoregional Conservation Blueprint – 2001)

#### 1. Riparian/Wetlands Systems Group

Riparian and wetlands group is transitional between terrestrial ecological systems and aquatic habitats. They occur in all geographic sections of the ecoregion, although they cover less than 1% of the entire ecoregion. Riparian and wetlands include five linear or small patch ecological systems: desert riparian shrubland and woodland, montane riparian shrubland, montane riparian woodland, wet meadow, and freshwater marsh. Additionally, fen and bog habitats, which are very small relictual areas from wetter times, are included.

**Freshwater Marsh:** This ecological system consists of permanently flooded and permanently saturated wetlands dominated by duckweeds, pondweeds, azollas, ditchgrass, bulrushes, cattails, and common reed (*Lemna*, *Potamogeton*, *Azolla*, *Ruppia Scirpus*, *Typha*, and *Phragmites* spp.). These are wetlands with standing water for most of the growing season and most of the year. Stands occur in ditches, rivers, streams, channels, and ponds from sea level to 2,300 m (7,545 ft) elevation. It occupies basins where the water table may remain relatively high, but can drop below the soil surface late in the growing season. Soils are deep, poorly drained, muck, peat, or mineral. Wettest sites are typically dominated by common cattail (*Typha latifolia*), while drier sites support herbaceous communities dominated by sedges, Kentucky bluegrass (*Carex* spp., *Poa pratensis*) or other grasses. Alkaline tolerant communities are included in the playa lake system.

**Desert Riparian Shrubland and Woodland:** This ecological system consists of vegetation that grows on small, flashy intermittent and ephemeral streams, as well as along large perennial rivers. Dominant trees include Frémont cottonwood, Goodding willow, and arroyo willow with boxelder and velvet ash (*Populus fremontii*, *Salix gooddingii*, and *S. lasiolepis*, *Acer negundo* and *Fraxinus velutina*) in the south. Shrub dominants include Geyer willow, silver buffaloberry, and coyote willow (*Salix geyeriana*, *Shepherdia argentea*, and *Salix exigua*). These woodlands occur as small isolated stands or as linear bands that parallel stream channels. Sites are flat to gently sloping and occur in lower canyons in desert mountains, on alluvial fans, and in valleys. Substrates are generally well drained, coarse-textured soils derived from stratified alluvium composed of sand, loam, gravel and cobbles. The soils may be slightly alkaline and saline. This vegetation is dependent on annual or periodic flooding or an annual rise in the water table for growth and reproduction.

**Montane Riparian Shrubland and Woodland:** Montane riparian shrublands and montane riparian woodlands were combined into one type for the purpose of crosswalking to GAP vegetation map units. Montane riparian shrublands occur as narrow bands of shrubs lining swift-flowing montane creeks and streams, tall willow carrs on broad floodplains of low-gradient meandering reaches of montane streams, and low-stature willow carrs in broad snow-melt fed basins in the subalpine. Typical dominant species include mountain alder, silver sagebrush, western water birch, western dogwood, Woods wildrose,

Booth willow, Drummond willow, Geyer willow, arroyo willow, Lemmon willow, yellow willow, and Wolf willow (*Alnus incana*, *Artemisia cana*, *Betula occidentalis*, *Cornus sericea*, *Rosa woodsii*, *Salix boothii*, *S. drummondiana*, *S. geyeriana*, *S. lasiolepis*, *S. lemmonii*, *S. lutea*, and *S. wolfii*). Typical understory components vary from dense graminoids and forbs to bare alluvial cobbles. Montane riparian shrublands depend on perennial or intermittently available moisture, avoid drought periods by having phreatophytic roots, and respond positively to flooding disturbance.

Montane riparian woodland is similar to the above in physical setting and ecological processes. It contains the narrow-leaved cottonwoods and conifers that line montane streams. This system is almost always narrow, whereas montane shrublands can be very wide. Dominant species include black cottonwood, narrowleaf cottonwood, quaking aspen, and black oak (*Populus balsamifera*, *P. angustifolia*, *P. tremuloides*, and *Quercus kelloggii*) with various shrubby understory components including western dogwood, skunkbush sumac, Woods wildrose, mountain alder, and several willows (*Cornus sericea*, *Rhus trilobata*, *Rosa woodsii*, *Alnus incana*, *Salix* spp.). Montane woodlands, particularly those dominated by cottonwoods, are dependent on flooding disturbance for reproduction and re-establishment, and on periodic and annual rise in groundwater levels for general maintenance.

**Wet Meadow:** This ecological system consists of entirely herbaceous vegetation on seasonally saturated to temporarily flooded areas. Dominant species include sedges, wildryes, monkeyflowers, rushes, spikerushes, and tufted hairgrass (*Carex*, *Leymus*, *Mimulus*, *Juncus*, *Eleocharis* spp., and *Deschampsia cespitosa*). Stands are found on relatively mesic, gentle to moderate slopes, such as terraces, uplands from toeslopes to the shoulder of the slope, broad valleys, mesic patches in semi-arid shrublands and seepage sites. Sites are often more mesic than surrounding habitats. Soils are typically deep, fine textured loams and clays, that may be only 40 cm deep on some sites. They may be saline or non-saline with pH of 7-10. Parent material includes alluvium and colluvium derived from limestone or basalt and loess.

**Fens and bog habitats:** (not described in Great Basin Ecoregional Conservation Plan)

## 2. Aquatics

Great Basin aquatic ecological systems fall into four basic categories based on duration and movement of water—permanent standing, permanent flowing, ephemeral standing, and ephemeral flowing aquatic types. These categories are the basis for a preliminary aquatic classification system developed for the Great Basin ecoregion. However, it also was useful to describe them in nine familiar habitat types. Refinement of the preliminary aquatics classification system is needed for future iterations of the ecoregional plan.

Terminal lakes, which are classic landscape features of the internally drained Great Basin, and montane pools and lakes are habitats of permanent standing waters. Rivers and their major tributaries, springs and springbrooks, low gradient streams, and high gradient streams are the four habitat types of permanent flowing waters. Playa lakes and smaller ephemeral pools are aquatic habitats of ephemeral standing waters. And, ephemeral or intermittent creeks and streams at all elevations are habitats of ephemeral flowing waters. The aquatic types occur in all geographic sections of the ecoregion and at all elevations. Although the ecoregion is a desert, terminal lakes cover almost 3% of its areal extent, which is just a bit less than the montane to alpine zonal system group.

### 3. Lower Montane

Lower montane ecological systems occur across middle elevations of the ecoregion in almost all geographic sections. This group covers about 17% of the ecoregion, which is the third largest coverage of the system groups. Three large patch ecological systems comprise the lower montane group: pinyon-juniper woodland, low montane shrubland, and mountain mahogany woodland. Pinyon-juniper woodlands sometimes are referred to as pygmy woodlands because the dominant trees are smaller stature species than other montane conifers. Montane shrublands include chaparral communities that are fire dependent. In contrast, mountain mahogany woodlands are fire intolerant.

**Pinyon-Juniper Woodlands:** This ecological system is comprised of woodlands dominated by a mix of singleleaf pinyon pine and Utah juniper, pure or nearly pure stands of singleleaf pinyon pine, or woodlands dominated solely by Utah juniper. On the eastern and western fringes of the Great Basin, other species of pine and juniper may codominant or even dominant these woodlands. Adjacent vegetation is commonly (about 90% of the time) sagebrush steppe at the lower and upper elevation margins and sometimes montane and subalpine coniferous vegetation at the upper margin. More than half (53%) of the ELUs that coincide with pinyon-juniper woodlands are at moderate elevations between 1,525-2,900 m (5,000 – 9,500 ft), on granitic-silicic, carbonate-limestone, shale or colluvial deposits, on lower and upper bajada slopes of 2-24%, and with southwest, northeast, or relatively flat exposures.

**Low Montane Shrubland:** This ecological system consists of patchy shrubland communities found in the lower montane belt of mountain ranges throughout the Great Basin. Dominant species include saskatoon serviceberry, Utah serviceberry, Parry rabbitbrush, whitethorn ceanothus, snowbrush ceanothus, greenleaf manzanita, Gambel oak, and turbinella oak (*Amelanchier alnifolia*, *A. utahensis*, *Chrysothamnus parryi*, *Ceanothus cordulatus*, *C. velutinus*, *Arctostaphylos patula*, *Quercus gambelii* and *Q. turbinella*). About 46% of the ELUs that coincide with the low montane shrubland system are at moderate elevations between 1,981-2,900 m (6,500-9,500 ft), on granitic-silicic, shale, carbonate-limestone, and young alluvial deposits, on lower and upper bajada slopes of 2-25% to steeper slopes of 26-35%, and with northeast or southwest exposures.

**Mountain Mahogany Woodland:** This ecological system consists of woodlands and shrublands dominated by curleaf mountain mahogany (*Cercocarpus ledifolius* var. *intermontanus*). Codominant and understory species include big sagebrush, mountain snowberry (*Symphoricarpos oreophilus*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). It can form large stands on the toeslopes and steeper faces of the lower montane and foothill elevational belt, and it is typically restricted to rocky, arid slopes and ridges. These woodlands provide good cover and nesting sites for wildlife. In hotter and drier situations, it is replaced by Stansbury cliffrose (*Purshia mexicana*) communities of low montane ecological systems. Exactly half (50%) of the ELUs are at higher elevations between 2,291-2,900 m (7,500-9,500 ft), on mostly granitic-silicic substrates, on toeslopes, lower and upper bajada slopes, and ridgetops, and mostly on southwest exposures.

### 4. Sagebrush Semi-desert

Simply stated, this is the “sagebrush ocean”. It is the second largest of the system groups in the Great Basin and covers about 33% of the ecoregion. The sagebrush semi-desert group occurs across the entire

ecoregion in all geographic sections on lower elevation non-alkaline soils of the piedmont slopes. There are three matrix forming and large patch ecological systems in this group: sagebrush semidesert, sagebrush steppe, and bitterbrush shrubland.

**Sagebrush Semidesert:** This ecological system is one of the largest and most representative in the ecoregion. The sagebrush semidesert occurs on dry, non-saline valley floors, toeslopes, and lower slopes where shrublands are dominated by basin big sagebrush, Wyoming big sagebrush, black sagebrush, silver sagebrush, or low sagebrush (*Artemisia tridentata* ssp. *tridentata*, *A. t.* ssp. *wyomingensis*, *A. nova*, *A. cana* or *A. arbuscula*). Occasional component shrubs include varieties of rabbitbrush and ephedras, and spiny hopsage (*Chrysothamnus* spp., *Ephedra* spp., and *Grayia spinosa*), while the herbaceous understory is typically limited. Shrubs are generally less densely spaced than in sagebrush steppe, and in undisturbed stands the interspaces are composed of vesicular foamy surface soils or microphytic crusts. The herbaceous understory is usually located near or under shrubs. Shrubs are commonly located on hummocks of elevated microrelief caused by differential erosion and deposition (West and Young 2000). With a few exceptions, they are all above 1,525 m (5,000 ft) and occur on toeslopes of mountains, between shadscale shrublands on lower more saline surfaces and pinyon-juniper woodlands on higher mountain slopes.

**Sagebrush Steppe:** This ecological system consists of more dense sagebrush shrublands with a significant grass understory. Dominant shrub species include basin big sagebrush, Wyoming big sagebrush, and low sagebrush (*Artemisia tridentata* ssp. *tridentata*, *A. t.* ssp. *wyomingensis*, and *Artemisia arbuscula*). Dominant grass species vary and include Idaho fescue, Great Basin wildrye, bluebunch wheatgrass, western wheatgrass, Thurber needlegrass and Sandberg bluegrass (*Festuca idahoensis*, *Leymus cineris*, *Pseudoroegneria spicata*, *Agropyron smithii*, *Stipa thurberiana*, and *Poa secunda*). The abundance of herbaceous plants depends on time since fire, insect outbreaks, very wet springs, and very cold and dry winters. A microphytic crust composed of mosses, lichens, and algae is found in interspaces of the perennial shrubs and grasses in high condition communities that are not or are lightly grazed. About 66% of the ELUs that coincide with the sagebrush steppe system are at moderate elevations between 1,525-2,290 m (5,200 – 7,500 ft), on young alluvium-colluvium-glacial deposits, shale, granitic, or carbonate limestone on flat or gentle bajada slopes.

Good condition sagebrush steppe communities tend to have moderate to high species diversity. Zamora and Tueller (1973) found 54 plant species in high-condition low sagebrush steppe in northern Nevada. The vegetation evolved with large browsers that mostly disappeared about 12,000 years ago. Lower numbers of gramnivore populations were present in presettlement times along with small populations of hunter-gathering Native Americans. Historically, the largest ungulate was the pronghorn, while jackrabbits, cottontails, and rodents may have been the major herbivores (Young 1994).

**Bitterbrush Shrubland:** This ecological system consists of shrublands that transition into and expand in the mountains. Antelope bitterbrush (*Purshia tridentata*) is the dominant species, although occasionally in the southern part, Mojave buckwheat (*Eriogonum fasciculatum*) is a codominant. This shrubland occurs in relatively small patches, usually less than 100 ha in size. The largest stands occur on the eastern flank of the Sierra Nevada. Smaller patches occur within the mountain shrub zone of many mountain ranges to the east. Almost all (97%) of the ELUs that coincide with the bitterbrush shrubland system are at low elevations between 1,525-1,980 m (5,200 – 6,500 ft), on young alluvium-colluvium-glacial deposits, old alluvium, shale or granitic substrates, on lower to upper bajada (2-25%) slopes, and with southwest to northeast exposures.

## 5. Montane to Alpine

The montane to alpine group characterizes mountaintops in the Great Basin. These ecological systems occur at the highest elevations of the ecoregion and typically in all geographic sections. The group covers only about 3.5% of the Great Basin and has the smallest extent of the zonal system groups. There are six large and small patch ecological system conservation targets in the montane to alpine group. From lower to higher montane elevations they are ponderosa pine, montane forest and woodland, montane meadow, mountain sagebrush, subalpine forest and woodland, and alpine herbaceous. These systems have relatively high endemism because of the isolating nature of the intervening valleys.

**Mountain Sagebrush:** This ecological system consists of sagebrush shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) or sometimes by dwarf sagebrush (*Artemisia arbuscula* ssp. *longiloba*), which occupies a distinct elevational belt above other sagebrush communities in the Great Basin ecoregion. Mountain snowberry (*Symphoricarpos oreophilus*) can be a codominant shrub in a few communities. Herbaceous species include Idaho fescue, spike-fescue, Great Basin wildrye, California brome, bluebunch wheatgrass, and compact phlox (*Festuca idahoensis*, *Leucopoa kingii*, *Leymus cinereus*, *Bromus carinatus*, *Pseudoroegneria spicata*, and *Phlox condensata*). About half (52%) of the ELUs that coincide with mountain sagebrush shrublands are at higher elevations between 2,291-2,900 m (7,500 – 9,500 ft), on granitic-silicic, carbonate-limestone, or shale derived substrates, on toeslopes, lower and upper bajadas and steep slopes, and with southwest or northeast exposures.

**Montane Forest and Woodlands:** This ecological system consists of the diverse forested communities that occur in the mountains above the pinyon-juniper and mountain sagebrush but below the subalpine forests. Stands are dominated by a variety of conifers including Douglas fir, white fir, Jeffrey pine, lodgepole pine, and the deciduous quaking aspen (*Pseudotsuga menziesii*, *Abies concolor*, *Pinus jeffreyi*, *Pinus contorta*, and *Populus tremuloides*). Understory shrub components are greenleaf manzanita, snowberry, curleaf mountain mahogany, creeping barberry, mountain big sagebrush, and common juniper (*Arctostaphylos patula*, *Symphoricarpos* spp., *Cercocarpus ledifolius* var. *intermontanus*, *Mahonia repens*, *Artemisia tridentata* ssp. *vaseyana*, and *Juniperus communis*). The herbaceous grass cover includes bluebunch wheatgrass, while associated forbs include common yarrow, Engelmann aster, duncecap larkspur, sticky geranium, silvery lupine, western sweet cicely, western brackenfern, western coneflower, Fendler meadowrue, western valerian, northern mule ears (*Achillea millefolium*, *Aster engelmannii*, *Delphinium occidentale*, *Geranium viscosissimum*, *Lupinus argenteus*, *Osmorhiza chilensis*, *Pteridium aquilinum*, *Rudbeckia occidentalis*, *Thalictrum fendleri*, *Valeriana occidentalis*, *Wyethia amplexicaulis*) and many others. Two-thirds (66%) of the ELUs that coincide with montane forest and woodlands are at higher elevations between 2,291-2,900 m (7,500 – 9,500 ft), on granitic-silicic, carbonate-limestone, or basaltic-mafic derived substrates, on toeslope, lower and upper bajadas or steep slopes and ridgetops, and with northeast or southwest exposures.

**Subalpine Forest and Woodland:** This ecological system consists of the conifer forests where mountain ranges are high enough to provide habitat above montane forests. They occur to treeline at approximately 3,300 m (11,000 ft) above which stands may persist as krummholz clumps. The

subalpine forest and woodland system is composed of stands dominated by subalpine fir, Engelmann spruce, whitebark pine, intermountain bristlecone pine, or limber pine (*Abies lasiocarpa*, *Picea engelmannii*, *Pinus albicaulis*, *Pinus longaeva*, or *Pinus flexilis*). Quaking aspen (*Populus tremuloides*) is an occasional codominant tree. The understory shrub component includes common juniper, mountain gooseberry, and mountain mahogany (*Juniperus communis*, *Ribes montigenum* and *Cercocarpus ledifolius* var. *intermontanus*). Dominant herbaceous layer species include Ross sedge and Fendler meadowrue (*Carex rossii* and *Thalictrum fendleri*). Many (70%) of the ELUs that coincide with subalpine forest and woodlands are at higher elevations between 2,291-4,406 m (7,500 –14,500 ft), on granitic-silicic or carbonate-limestone derived substrates, on upper bajadas, steep slopes, or ridgetops, and with southwest or northeast exposures.

**Alpine Herbaceous:** This ecological system is a low stature woody and herbaceous growth that occurs above treeline. Dominant species include shrubby cinquefoil, tufted hairgrass, Shasta sedge, spring sedge, alpine timothy, alpine avens, and cushion phlox (*Pentaphragmoides floribunda*, *Deschampsia cespitosa*, *Carex stramineiformis*, *C. vernacula*, *Phleum alpinum*, *Geum rossii*, and *Phlox pulvinata*).

**Ponderosa Pine Woodland:** This ecological system consists of open and park-like stands dominated by ponderosa pine (*Pinus ponderosa*). Understory shrub species include curleaf mountain mahogany, Gambel oak, greenleaf manzanita, and antelope bitterbrush (*Cercocarpus ledifolius* var. *intermontanus*, *Quercus gambelii*, *Arctostaphylos patula*, and *Purshia tridentata*). Ponderosa pine woodlands are limited in the Great Basin ecoregion to the eastern slope of the Sierra Nevada (*Pinus ponderosa* var. *ponderosa*) and to the mountain ranges in the southeast quarter of the ecoregion (*Pinus ponderosa* var. *scopulorum*). They occur at the interface of dry chaparral-like shrublands with montane forest elevations. Many (83%) of the ELUs that coincide with ponderosa pine woodlands are at higher elevations between 2,291-2,900 m (7,500-9,500 ft), on granitic-silicic substrates, on lower and upper bajada slopes of 2-25%, or steeper slopes 26-35%, and with southwest exposures.

**Montane Meadow:** This ecological system consists of the drier meadows within the montane belt. Dominant species are Douglas sedge, Sandberg bluegrass, and mat muhly (*Carex douglasii*, *Poa secunda*, and *Muhlenbergia richardsonis*). The majority (80%) of the ELUs that coincide with montane meadows occur between 1,981-2,900 m (6,500 –9,500 ft) in elevation, on granitic-silicic derived substrates, and on lower to upper bajadas.

## 6. Basins and Desert Scrub

The basins and desert scrub group characterizes the lowermost elevations of the ecoregion. These ecological systems occupy alluvial flats and playas on the basin floors, and alluvial fans (also called lower bajadas) and mountain-valley fans (or upper bajadas) on the surrounding piedmont slopes. This is the largest of the system groups covering about 37% of the entire ecoregion. There are six matrix or large patch ecological system conservation targets in the basins and desert scrub group. They are playa lake/pickleweed flats, greasewood shrubland, salt desert scrub, blackbrush-hopsage shrubland, semidesert shrub steppe, and Joshua tree-mixed Mojave scrub in which we included creosote bush as well (table 13). The four common ecological systems that cover the greatest extent occur in all six geographic sections of the Great Basin. The less common latter two ecological systems, with the least extent, occur in the southern portions of the California and Tonopah sections only as they are transitional to the Mojave Desert ecoregion.

**Salt Desert Scrub:** This matrix forming ecological system is one of the largest systems in the Great Basin and reaches its full potential in terms of size and diversity in this ecoregion. It is dominated by shadscale, Gardner saltbush, fourwing saltbush, basin big sagebrush, winterfat, or Bailey little greasewood (*Atriplex confertifolia*, *A. gardneri*, *A. canescens* *gigas* form, *Artemisia tridentata* ssp. *tridentata*, *Krascheninnikovia lanata*, or *Sarcobatus baileyi*). Codominant shrubs include bud sagebrush, big greasewood, desert saltbush, and Nevada ephedra (*Atriplex spinescens*, *Sarcobatus vermiculatus*, *Atriplex polycarpa*, and *Ephedra nevadensis*). Limited herbaceous understory plants include ricegrass and desert saltgrass (*Oryzopsis hymenoides* and *Distichilis spicata* var. *stricta*). About 78% of the ELUs that coincide with salt desert scrub are at lower elevations between 321-1,980 m (1,050-6,500 ft), on young alluvium-colluvium-glacial deposits, on lower bajada slopes less than 2%, or flat surfaces that are generally dry upland sites, but some stands experience either intermittent flow or intermittent wet periods. In most settings, regardless of landform, the water table is well below one meter.

These shrublands are usually associated with edges of valley bottoms or alluvial slopes with medium to fine-textured soils, but they may occur on coarser soils of erosional slopes with calcareous substrates. In most cases, the soils are alkaline (pH 7.5-8.5). Contiguous vegetation is usually big sagebrush shrublands at the upper elevation margin and saltbush-greasewood shrublands on heavy soils of closed drainage basins. Shrubs are generally widely-spaced and clustered. Interspaces are usually covered with soft, rugose microphytic crusts if the soil has not been compacted by livestock or off-road vehicles (West and Young 2000).

**Greasewood Shrubland:** This large patch ecological system comprises the lowlands of valley bottoms where heavy clay soils and salts accumulate. Big greasewood (*Sarcobatus vermiculatus*) is the dominant shrub. It often occurs as the sole dominant or less often various codominant shrubs are present, for example, shadscale or rubber rabbitbrush (*Atriplex confertifolia* or *Chrysothamnus nauseosus*). On occasion, alkali rabbitbrush (*Chrysothamnus albidus*) dominates with Lemmon's alkaligrass (*Puccinellia lemmonii*) in the understory. The presence of herbaceous species and their abundance depends on soil characteristics and duration of inundation. This system can form small, narrow linear bands, or very large patches covering much of the valley floor where conditions are favorable. Almost all (97.5%) of the ELUs that coincide with greasewood shrublands are at lowest elevations between 321-1,980 m (1,050-6,500 ft), on young alluvium-colluvium-glacial deposits, on topographically flat or gentle slopes, and are either intermittently wet, have intermittent flow, or experience no surface flow throughout the year.

**Semi-desert Shrub Steppe:** This ecological system consists of sparsely covered low elevation grasslands of the Great Basin. Most plant associations within this system have low total herbaceous cover, and many have a shrub or subshrub component. Dominant species include ricegrass, Nevada ephedra, galleta grass, desert needlegrass, Great Basin wildrye, western wheatgrass, bluebunch wheatgrass, various bluegrasses, and Idaho fescue (*Oryzopsis hymenoides*, *Ephedra nevadensis*, *Hilaria jamesii*, *Stipa speciosa*, *Leymus cineris*, *Pascopyrum smithii*, *Pseudoroegneria spicata*, *Poa* spp., and *Festuca idahoensis*). Many (73%) of the ELUs that coincide with semidesert shrub steppe are at lowest elevations between 321-1,980 m (1,050-6,500 ft), on young alluvium-colluvium-glacial or old alluvial deposits, on lower bajadas of less than 2% slope, or flat landforms, and are dry, that is, they depend solely on rainfall for moisture.

**Playa Lakes:** These are wide flat expanses of dried salt and clay flats on basin floors. During the wetter Pleistocene Epoch, many basins filled with lake waters and sediments and soluble salts from the

mountains washed in. Most of the lakes dried in the subsequent warm period of the Holocene and soluble salts remain in the soil profiles today. Vegetative communities that can live under these harsh conditions are typically alkaline and salt tolerant. Characteristic and dominant species include alkali seepweed, desert saltgrass, alkali sacaton, western niterwort, alkali cordgrass, iodinebush, and arrowweed (*Suaeda moquinii*, *Distichilis spicata* var. *stricta*, *Sporobolus airoides*, *Nitrophila occidentalis*, *Spartina gracilis*, *Allenrolfea occidentalis*, and *Pluchea sericea*). Nearly all playa lakes dry up cyclically, so vegetation can be non-existent, sparse, or ephemerally abundant. Almost all (98.5%) of the ELUs that coincide with playa lakes are at lowest elevations between 321-1,980 m (1,050-6,500 ft), on young alluvium-colluvium-glacial deposits, while they are always topographically flat, and are either intermittently wet, have intermittent flow, or are dry throughout the year.

**Blackbrush - Hopsage Shrubland:** This ecological system is transitional with the warm Mojave Desert and consists of desert shrublands dominated by blackbrush, spiny hopsage, or spiny menodora (*Coloegyne ramosissima*, *Grayia spinosa* or *Menodora spinescens*). Blackbrush-hopsage shrublands are restricted to the California and Tonopah sections at the southern-most edge of the ecoregion. For this discussion, the peripheral plant communities of Joshua tree and mixed Mojave scrub GAP map units, which consist of Joshua tree, creosote bush, or Mojave buckwheat (*Yucca brevifolia*, *Larrea tridentata*, or *Eriogonum fasciculatum*) dominated communities, have been included. About a third (35%) of the ELUs that occur with blackbrush-hopsage shrubland are at lowest elevations between 321-1,980 m (1,050-6,500 ft), on young alluvium-colluvium-glacial deposits, and on flat landforms that are dry. Another 42% are at lower elevations between 321-1,980 m (1,050-6,500 ft), on granitic-silicic, shale, sandstone, or carbonate-limestone surfaces, on upper bajada and lower bajada slopes, and with northeast or southwest exposures.

### **Joshua Tree-Mixed Mojave Scrub** (from Mojave Desert Ecoregional Plan)

#### **7. Sand Dunes and Badlands**

Sand dunes, badlands, and other barren ecological systems comprise an azonal group that are defined moreso by substrate characteristics than by regional climatic factors. They include relictual bedrock outcrops, weathered soil patches, aeolian deposits (dunes), and other areas dominated by substrate rather than by vegetative cover. They often define unique habitats and support endemic plant and animal species. They occur in all geographic sections of the Great Basin, although sand dunes do not occur in the north central section. They cover only about 2% of the ecoregion, which is the smallest extent of all system groups. Sand dunes, badlands, clifflands and altered andesites are large and small patch ecological systems, and along with subterranean cave habitats, make up the substrate dominated system group.

**Badlands:** Vegetation found within this system is often dominated by unique plant species or may be non-vascular lichens or cryptogamic species. Vascular plants include grasses, such as alkali muhly (*Muhlenbergia asperifolia*). Badlands are found at all elevations, although low and moderate elevations are more common, and on steep bedrock outcroppings, ridgetops, windswept barrens, or on less steep alluvial and colluvial deposits.

Mono pumice barrens occur in eastern California on the western edge of the Great Basin. They harbor a unique herbaceous flora along with the most extensive stands of pure Jeffrey pine (*Pinus jeffreyi*) forest in the ecoregion.

**Sand Dunes:** This ecological system consists of stabilized to partially stabilized sand dunes dominated by desert sandverbena, big greasewood, daleas, ricegrass, fourwing saltbush, and four-part horsebrush (*Abronia villosa*, *Sarcobatus vermiculatus*, *Psoralea* spp., *Oryzopsis hymenoides*, *Atriplex canescens*, and *Tetradymia tetrameres*). Sand dunes occur between 321-1,980 m (1,050-6,500 ft) in elevation, on young alluvium-colluvium deposits or on eolian sand. Sand dunes are constantly being eroded and reformed by the prevailing wind. Plant cover therefore is very sparse. Water is held for long periods of time just under the surface, which allows shrubs to successfully root and persist through long droughts. Large dunes are often barren at their tops, due to shifting sand and an unreachable water table. Some plant species have adaptations to this environment, for example, fourwing saltbush varies widely in its chromosomal content and response to the shifting dune environment. In some locations, fourwing saltbush grows four times as fast as normal plants, and its roots have adapted to develop photosynthetic tissue if exposed to sunlight.

**Clifflands:** Vertical and near-vertical clifflands are small patch habitats scattered throughout the ecoregion that often harbor unique bio-diversity. Bats and falcons are important animal species that use cliffland habitats.

**Caves** (not described in Great Basin Ecoregional Plan)

**8. Agricultural Habitat** (in PIF BCP- no counterpart in Great Basin Ecoregional Plan)

## APPENDIX C

### Functional Landscape Site Descriptions

(From: The Nature Conservancy's (TNC) Great Basin Ecoregional Conservation Blueprint – 2001)

**Argenta Marsh** (no TNC narrative description for this landscape site)

**Artesia Lake-East Pine Nut Mountains**—excellent pinyon woodlands with connectivity west to Sierra Nevada for wide-ranging species; one and only site for Churchill Narrows buckwheat; aquatic habitats important for migratory waterbirds.

**Bald Mountain** (no TNC narrative description for this landscape site)

**Battle Mountain** (no TNC narrative description for this landscape site)

**Beaver Dam Wash/Bull Valley Mountains** (no TNC narrative description)

**Belted Range-Kawich Valley-Gold Flat/Timber Mountain/Emigrant Valley-Halfpint**

**Range**—large functional landscapes with connectivity to Mojave Desert; one and only site for Pahute green gentian; important for pinyon-juniper woodlands and low montane shrublands.

**Black Rock Desert-Smoke Creek Desert**—largest absolute desert in the Lahontan Basin section; large landscape site important for desert bighorn sheep; excellent examples of saltbush, greasewood, and sagebrush communities

**Blue Lakes/Badlands** (no TNC narrative description for this landscape site)

**Bodie Hills** (no TNC narrative description for this landscape site)

**Butler Basin (Toquima Range)** (no TNC narrative description for this landscape site)

**Carson Range Front (Long Valley)** (no TNC narrative description)

**Carson River**—part of a functional network that connects to the Sierra Nevada ecoregion; excellent examples of spring-fed freshwater marsh systems; four endemic butterflies and the one and only site for two of them—Carson Valley wood nymph and Carson Valley sandhill skipper; important desert riparian shrublands habitat for numerous breeding and migratory bird targets.

**Carson Sink**—Lahontan Valley has globally significant concentrations of Wilson's phalarope, eared grebe, and American avocet; 10-100 million migratory birds; part of the Western Hemispheric Shorebird Reserve Network; excellent example of large ephemeral terminal playa lake; includes sand dune systems with 12 obligate beetles and several dune plants.

**Cave Valley-Upper White River Valley**—component of a functional landscape scale network of sites important for desert bighorn sheep and sagebrush obligates; full suite of terrestrial ecological systems and has important aquatic habitats; one and only site for three endemics including the White River mottled sculpin, Butterfield springsnail, and Lake Valley springsnail.

**Cortez Mountains-Roberts Mountains-Sulphur Spring Range**—large functional landscape site with both low and high elevation terrestrial ecological systems and aquatic habitats; sagebrush obligate species in very good condition habitats.

**Currant Mountain/White Pine Range** (no TNC narrative description)

**Desatoya Mountains**—high diversity of terrestrial ecological systems with excellent examples of mountain mahogany, pinyon-juniper, and low montane communities; montane riparian shrublands associated with Lahontan cutthroat trout aquatic habitats.

**Dry Lake Valley** (no TNC narrative description for this landscape site)

**Duck Creek Range-Steptoe Valley**—another excellent example of higher elevation valley floor communities and aquatic habitats, but with connectivity to montane ecological systems as well; high diversity of springsnails and butterflies.

- Duckwater Valley** (no TNC narrative description for this landscape site)
- East Humboldt Range** (no TNC narrative description for this landscape site)
- Fourmile Basin**—important sagebrush and lower montane systems in the Tonopah Section harboring sagebrush obligate species.
- Garfield Flat-Rhodes Salt Marsh-Teels Marsh**—important site for sand dune systems in addition to saltbush, greasewood, and sagebrush communities; harbors a suite of 12 obligate sand beetles.
- Humboldt Range** (no TNC narrative description for this landscape site)
- Humboldt River/Golconda** (no TNC narrative description for this landscape site)
- Humboldt River/Imlay** (no TNC narrative description for this landscape site)
- Jackson Mountains** (no TNC narrative description for this landscape site)
- Long Mountain/Monte Cristo Range** (no TNC narrative description)
- Long Valley (Carson Range Front)** (no TNC narrative description)
- Lovelock Valley** (no TNC narrative description for this landscape site)
- Meadow Valley**—ribbons of wet meadows and desert riparian shrublands habitats among transitional desert uplands; important for several migratory waterbirds; one and only site for the Big Spring spinedace, and for Schlessers pincushion.
- New Pass (Desatoya Mountains)** (no TNC narrative description for this landscape site)
- Pequop Mountains/Toano Draw** (no TNC narrative description for this landscape site)
- Pilot Mountains** (no TNC narrative description for this landscape site)
- Pilot Range** (no TNC narrative description for this landscape site)
- Pyramid Lake-Lower Truckee River**—excellent examples of remaining Frémont cottonwood forests; important riparian habitats for breeding and migratory birds; spawning habitats for endangered cui-ui and threatened Lahontan cutthroat trout. Also a premier example of terminal lake with fish; endemic cui-ui and Hardscrabble springsnail; large American white pelican colony with about 25,000 individuals; high diversity of small mammals (heteromyids) and very important for diversity of bats; see also riparian and wetlands highlights.
- Quinn Canyon Range-Grant Range**—diversity of higher elevation plant communities in very good condition; functional landscape for desert bighorn sheep.
- Quinn River** (no TNC narrative description for this landscape site)
- Railroad Valley**—significant basin floor terrestrial communities and aquatic habitats in the Tonopah section; one and only site for Lockes springsnail.
- Rainbow Canyon**—ribbons of desert riparian shrublands and freshwater marshes among transitional desert uplands; important for several migratory waterbirds; important for Meadow Valley Wash—desert sucker and Meadow Valley speckled dace.
- Ruby Mountains**—high diversity of conifers; excellent mountain brush and alpine communities, important montane aquatic habitats; one and only site for Grey’s silverspot and Ruby Mountains primrose.
- Ruby Valley**—Ruby Marshes is largest example of spring-fed terminal lake with densest concentration of redheads in the world (20,000 pairs); Franklin Lake is the best unaltered ephemeral wetland with more than a quarter million water birds and shorebirds; Sulphur Hot Springs has endemic aquatic invertebrate and plant.
- Schell Creek Range** (no TNC narrative description for this landscape site)
- Shoshone/Beowawe** (no TNC narrative description for this landscape site)
- Shoshone Range/Carico Lake Valley** (no TNC narrative description)

- Silver State Sand Dunes**—important large dune system in the Lahontan Basin section; suite of 12 sand dune obligate beetles; distinctive riparian plant swales among the dune system; one and only site for three endemics including the Humboldt serican scarab, Rice’s blue, and a solitary bee.
- Simpson Park Mountains-North Toiyabe Range**—large functional landscape site linking both low and high elevation terrestrial ecological systems; good condition sagebrush for sage grouse.
- Snake Range**—excellent examples of higher elevation plant communities and basin aquatics; important site for diversity of bats; one and only site for Holmgren buckwheat and Wheeler Peak sandwort in alpine, and Baking Powder Flat blue and sub-globose snake springsnail in basin.
- Soldier Meadows**—hot springs complex with endemic desert dace and five endemic or limited springsnails (squat Mud Meadows, western Lahontan, northern Soldier Meadows, elongate Mud Meadows, and southern Soldier Meadows springsnails); best populations of Soldier Meadows cinquefoil.
- South Pine Nut Mountains** (no TNC narrative description for this landscape site)
- South Wassuk Range** (no TNC narrative description for this landscape site)
- Spring Valley/Hamlin Valley** (no TNC narrative description for this landscape site)
- Steptoe Valley**\_excellent example of higher elevation valley floor communities and aquatic habitats; high diversity of springsnails and only site for the endemic Steptoe hydrobe.
- Stoneberger Basin (Toquima Range)** (no TNC narrative description)
- Susie Creek/So. Fork Humboldt River** (no TNC narrative description)
- Sweetwater Mountains (Wellington Hills)** (no TNC narrative description)
- Toiyabe Range-Big Smoky Valley**\_part of a functional landscape scale network of sites important for desert bighorn sheep and sagebrush obligates; high diversity of terrestrial ecological systems and aquatic habitats; harbors very good examples of imperiled plant communities; one and only site for six Great Basin endemics including two plants (Ophir rockcress and Rollins clover), the Toiyabe spotted frog, two fishes (Big Smoky Valley speckled dace and Charnock Springs tui chub), and the Big Smoky wood nymph.
- Toquima Range-Monitor Valley-Monitor Range**\_part of a functional network of sites important for wide-ranging desert bighorn sheep; Monitor Valley is important for aquatics and is the one and only site for two fishes and a aquatic mollusk.
- Upper Humboldt River/Lower Mary’s River** (no TNC narrative description)
- Virginia Range** (no TNC narrative description for this landscape site)
- Walker Lake-Walker River**\_part of functional network connecting Sierra Nevada; very good condition freshwater and brackish marshes; important desert riparian shrublands for breeding and migratory birds; Lahontan cutthroat trout river system.
- Warm Springs Valley** (no TNC narrative description for this landscape site)
- White Mountains**\_more conservation targets than any other site in the portfolio; high diversity and viability of plant communities; one and only site for 12 endemic taxa including four butterflies, four plants, and the Fish Lake Valley tui chub.
- White Pine Range** (Currant Mountain) (no TNC narrative description)
- White River Valley**\_isolated endemic fishes including White River desert sucker, White River mottled sculpin, Preston White River springfish, Moorman White River springfish, White River speckled dace; isolated endemic springsnails; including Emigrant, Butterfield, Hardy, Pahranaagat, and

White River Valley springsnails. Basin floors include alkaline substrate habitats for endemic plants and butterflies.

**White Rock Mountains** (no TNC narrative description for this landscape site)